

NOTE

Subject: EPA Comments on Kansas City Board of Public Utilities, Nearman Creek Power Station, Kansas City, KS
Round 7 Draft Assessment Report

To: File

From: Jana Englander, OSWER, US EPA

Date: January 31, 2011

1. On p. 3, replace the following sentence: "The purpose of this report is to evaluate the condition and potential of waste release from the selected High Hazard Potential management units." with "The purpose of this report is **to evaluate the condition and potential of waste release from management units that have not been rated for hazard potential classification.**"

State: None

Company: See attached letter



March 2, 2011

Mr. Stephen Hoffman
US Environmental Protection Agency
Two Potomac Yard
2733 South Crystal Drive
5th Floor, N-5237
Arlington, VA 22202-2733

**Subject: Comments on Draft Coal Combustion Waste Impoundment Round 7 –
Dam Assessment Report (Site #009), Nearman Creek Power Station,
Coal Ash Pond Dike, Kansas City Board of Public Utilities, Kansas City,
Kansas**

Dear Mr. Hoffman:

Thank you for the opportunity to review the assessment report referenced above. Please accept this letter and the enclosed documents as our comments on the report.

We believe the “poor” rating for the Nearman bottom ash impoundment is unjustified. We strongly disagree with the implications that the safety of this community has ever been threatened. The impoundment was well designed by a licensed Professional Engineer and has been maintained and operated safely for 30 years – even withstanding the Missouri River flood of 1993!

The report states in the Purpose and Scope Section on page iii “*The purpose of this report is to evaluate the condition and potential of waste release from the selected **High Hazard** Potential management units,*” but in the Size And Hazard Classification Section on page 2-2, the report states “...*Dewberry evaluated the ash pond embankment hazard classification as ‘low’.*” If the stated purpose is to evaluate high hazard units and the Nearman unit is low, then we question whether this assessment should have been performed at all.

However, we have made arrangements with a geo-technical firm to perform a stability analysis on the embankments. A copy of the January 2011 purchase order transmittal for the work is enclosed. Our intention is to have the stability analysis performed as soon as possible, and we assume EPA will subsequently upgrade the impoundment classification from “poor” to “satisfactory” or better.

Mr. Stephen Hoffman
March 2, 2011
Page Two

Specific comments are provided as follows:

Page ii - First Paragraph

Please delete the entire first paragraph in the INTRODUCTION, SUMMARY CONCLUSIONS AND RECOMMENDATIONS Section. This misleading paragraph ["wake up call for diligence" (?) and "marshal our best efforts" (?)] is out of place in an unbiased technical report concerning a historically well-run impoundment.

"Critical"

Please replace the word "critical" with the word "supporting" when referencing information, technical documentation, etc., throughout the report. Again, the word "critical" is inappropriate for a low risk, Round 7 assessment report at a small impoundment that has been functioning well for 3 decades.

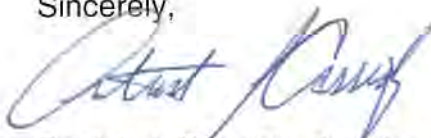
Other Edits

We have also enclosed a copy of the report with many other hand-written edits.

BPU requests the opportunity to re-review this Assessment Report prior to finalization because there are so many edits and comments on this first draft copy.

Thank you again for the opportunity to provide comments. If you have any questions, please contact me by phone at (913) 573-9856 or by email at pcassidy@bpu.com.

Sincerely,

A handwritten signature in blue ink, appearing to read "Patrick J. Cassidy".

Patrick J. Cassidy, Director
Environmental Services

PJC/pjc

C: D. Dorsey, J. Frick, I. Setzler, F. Lutz (LD&B)

Enclosures: 1. Purchase Order Transmittal to consultant for Stability Analysis at Nearman
2. Hand-written edits on Draft Assessment Report



**Kansas City.
Board of Public Utilities**

540 MINNESOTA AVENUE

KANSAS CITY, KANSAS 66101

(913) 573-9000

FILE COPY

January 26, 2011

Purchase order transmittal
for the Geotechnical Stability
Analysis at Nearman
PJC

Mr. Fred Lutz, P.E.
Lutz, Daily & Brain, LLC
Cloverleaf 4 Bldg
6400 Glenwood, Suite 200
Overland Park, KS 66202

Dear Mr. Lutz:

Enclosed is a signed original of Authorization No. 127 to provide professional consulting engineering services to perform a Geotechnical Stability Analysis of the Nearman Bottom Ash Pond.

Purchase order #36142 has been issued for this task and is also enclosed. Please indicate the purchase order number on the invoices and mail to the KC Board of Public Utilities, Attn: Accounting, 540 Minnesota Ave., Kansas City, KS 66101. Please indicate the following information, as applicable, on the invoices:

- a. Date of Invoice
- b. Invoice number
- c. Company name, address and remit to address
- d. BPU Purchase Order and/or Contract No.
- e. Task Authorization No.
- f. Period covered by the invoice
- g. The not-to-exceed amount of the contract
- h. Amount invoiced to date
- i. Total of all charges for the invoice
- j. Employee name/classification
- k. Hours worked on each task during the period (overtime and regular hours must be separated)
- l. Time Sheets
- m. Pay rate
- n. Total for each employee/classification (hours worked x pay rate)
- o. Total for all labor
- p. Overhead rate and amount charged for overhead (total labor \$ x overhead rate)
- q. Subtotal for labor and overhead
- r. Portion of fixed fee billed (if applicable)
- s. Subtotal for labor, overhead and fixed fee
- t. Direct expenses charged – itemized in detail such as listing all expense accounts paid, copies billed, telephone charges, sub-consultants, etc.
- u. Total of direct expenses billed



**Kansas City.
Board of Public Utilities**

540 MINNESOTA AVENUE

KANSAS CITY, KANSAS 68101

(913) 573-9000

Please coordinate this project with Mr. Patrick Cassidy, phone 913-573-9856.

If I can be of assistance, please contact me at 913-573-9134 or e-mail nwolf@bpu.com.

Sincerely,

KC Board of Public Utilities

Nan Wolf
Manager Purchasing & Supply

enc.

c: Pat Cassidy

PJK 2-15-11

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Coal Combustion Waste Impoundment Round 7 - Dam Assessment Report (Site #009)

Nearman Creek Power Station
Coal Ash Pond Dike
Kansas City Board of Public Utilities
Kansas City, Kansas

Prepared for:

United States Environmental Protection Agency
Office of Resource Conservation and Recovery

Prepared by:

Dewberry & Davis, LLC
Fairfax, Virginia

~~provide contract documents.~~



Under Contract Number: EP-09W001727
October 2010

* ~~As requested to verify pages 1105. 1106.~~
~~① Provide Contract documents for NJ EPA State Title Analysis.~~
~~② Generate transmittal letter. ① hand edits ② Contract documents ③ 'entirety' (11) 1st Para 111~~

The owner/operator provided all the information requested prior to the site visit. The ash management unit was well maintained and appeared to be in excellent condition. The only documentation missing was a formal stability analysis report.

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INTRODUCTION, SUMMARY CONCLUSIONS AND RECOMMENDATIONS

The release of over five million cubic yards from the Tennessee Valley Authority's Kingston, Tennessee facility in December 2008, which flooded more than 300 acres of land, damaging homes and property, is a wake-up call for diligence on coal combustion waste disposal units. We must marshal our best efforts to prevent such catastrophic failure and damage. A first step toward this goal is to assess the stability and functionality of the ash impoundments and other units, then quickly take any needed corrective measures.

Not relevant to BPU

This assessment of the stability and functionality of the Nearman Creek Power Station Ash Pond management unit is based on a review of available documents and on the site assessment conducted by Dewberry personnel on Tuesday, September 21, 2010. We found the supporting documentation lacking critical information (Section 1.1.3), specifically related to the structural stability of the dike. Sections 1.2.1 and 1.2.3 provide a recommendation for providing critical technical documentation regarding the structural stability of the dike, which is required to upgrade the rating of the ash pond dike from POOR to SATISFACTORY. In addition, Sections 1.2.5 and 1.2.6 provide recommendations based on field observations that may help to maintain a safe and trouble-free operation.

In summary, the Nearman Creek Power Station ash management unit is rated POOR due to the lack of information regarding the structural stability of the dike. No other recognized existing or potential management unit safety deficiencies were identified.

unknown and therefore

only

continue to

? How do these rating systems relate??

PURPOSE AND SCOPE

The U.S. Environmental Protection Agency (EPA) is embarking on an initiative to investigate the potential for catastrophic failure of Coal Combustion Surface Impoundments (i.e., management unit) from occurring at electric utilities in an effort to protect lives and property from the consequences of a dam failure or the improper release of impounded slurry. The EPA initiative is intended to identify conditions that may adversely affect the structural stability and functionality of a management unit and its appurtenant structures (if present); to note the extent of deterioration (if present), status of maintenance and/or a need for immediate repair; to evaluate conformity with current design and construction practices; and to determine the hazard potential classification for units not currently classified by the management unit owner or by a state or federal agency. The initiative will address management units that are classified as having a Less-than-Low, Low, Significant or High Hazard Potential ranking. (For Classification, see pp. 3-8 of the 2004 Federal Guidelines for Dam Safety)

The unit was well-maintained and the operators provided all the information requested prior to the site visit.

See Table 2.2b - page 2.2

~~PURPOSE AND SCOPE~~

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**** Note :** This unit is a Less-than-Low Hazard unit... it should not have been assessed at all! It's tight and only ~15 acres!! See page 2.2!!

In February 2009, the EPA sent letters to coal-fired electric utilities seeking information on the safety of surface impoundments and similar facilities that receive liquid-borne material that store or dispose of coal combustion waste. This letter was issued under the authority of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Section 104(e), to assist the Agency in assessing the structural stability and functionality of such management units, including which facilities should be visited to perform a safety assessment of the berms, dikes, and dams used in the construction of these impoundments.

EPA requested that utility companies identify all management units including surface impoundments or similar diked or bermed management units or management units designated as landfills that receive liquid-borne material used for the storage or disposal of residuals or by-products from the combustion of coal, including, but not limited to, fly ash, bottom ash, boiler slag, or flue gas emission control residuals. Utility companies provided information on the size, design, age and the amount of material placed in the units. The EPA used the information received from the utilities to determine preliminarily which management units had or potentially could have High Hazard Potential ranking.

* The purpose of this report is to evaluate the condition and potential of waste release from the selected High Hazard Potential management units. This evaluation included a site visit. Prior to conducting the site visit, a two-person team reviewed the information submitted to EPA, reviewed any relevant publicly available information from state or federal agencies regarding the unit hazard potential classification (if any) and accepted information provided via telephone communication with the management unit owner. *

Factors considered in determining the hazard potential classification of the management units(s) included the age and size of the impoundment, the quantity of coal combustion residuals or by-products that were stored or disposed of in these impoundments, its past operating history, and its geographic location relative to down gradient population centers and/or sensitive environmental systems.

This report presents the opinion of the assessment team as to the potential of catastrophic failure and reports on the condition of the management unit(s).

LIMITATIONS

all *requested of*
The assessment of dam safety reported herein is based on field observations and review of readily available information ~~provided by~~ the owner/operator of the subject coal combustion waste management unit(s). Qualified Dewberry engineering personnel performed the field observations and review and made the assessment in conformance with the required scope of work and in accordance with reasonable and acceptable engineering practices. No other warranty, either written or implied, is made with regard to our assessment of dam safety.

Nearman Creek Power Station
Kansas City Board of Public Utilities
Kansas City, Kansas

Coal Combustion Waste Impoundment
Dam Assessment Report

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see
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Doc 01:	USGS Parkville Quadrangle Map
Doc 02:	Lutz, Daily & Brain Design Drawing of Ash Pond
Doc 03:	Landfill Inspection and Tracking Form
Doc 04:	Terracon Report
Doc 05:	Construction Specifications for Contract 75A
Doc 06:	KDHE NPDES Permit No. 1-MO25-BOO1
Doc 07:	KDHE Solid Waste Permit No. 413
Doc 08:	KDHE Solid Waste Permit No. 413 Renewal
Doc 09:	US Army COE Final Envir. Statement—Geology
Doc 10:	KCBPU Emergency Response Action Plan (ERAP)

APPENDIX B - PHOTOGRAPHS

APPENDIX C – DAM INSPECTION CHECK LIST

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1.0 CONCLUSIONS AND RECOMMENDATIONS

1.1 CONCLUSIONS

Conclusions are based on visual observations from a one-day site visit, conducted on September 21, 2010, and a review of technical documentation provided by Kansas City Board of Public Utilities.

1.1.1 Conclusions Regarding the Structural Soundness of the Management Unit(s)

Dewberry engineers did not observe any significant structural defects on the dike during their site walkover. However, based on a lack of readily available documentation of critical engineering analyses verifying design slope stability, the structural soundness of the management unit is rated POOR.

1.1.2 Conclusions Regarding the Hydrologic/Hydraulic Safety of the Management Unit(s)

The management units at this location are part of a closed loop system fed by a bottom ash slurry from the boiler, decanting to a clear pond, and recycling to the plant boiler. There are no external sources of water other than rainfall on the inner embankments and the ponds themselves. The ponds are located above the 100-year flood level.

1.1.3 Conclusions Regarding the Adequacy of Supporting Technical Documentation

Most The supporting technical documentation is inadequate. The technical documentation lacks critical engineering analyses of dike slope stability.

1.1.4 Conclusions Regarding the Description of the Management Unit(s)

The description of the management unit provided by the Kansas City Board of Public Utilities was an accurate representation of what Dewberry observed in the field.

1.1.5 Conclusions Regarding the Field Observations

Dewberry staff was provided access to all areas in the vicinity of the management unit required to conduct a thorough field observation. The visible parts of the embankment dikes and outlet structures were observed to have no signs of overstress, significant settlement, shear failure, or other

* I would use the word "supporting" rather than "critical" because it is the stability analysis document is the only issue with a Round 7 impoundment that proved itself

Indeed the small, 15-acre impoundment appeared well-maintained. There were no apparent indications of unsafe conditions or conditions needing remedial action.

Supporting

unknown and therefore

However,

and have been well maintained including recent maintenance of the rip rap at the impoundment.

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signs of instability although visual observations were hampered by the presence of thick vegetation in some areas. Embankments appear structurally sound. There are no apparent indications of unsafe conditions or conditions needing remedial action.

Minor ~~seepage~~ was occurring ^{through a balloon plug located in} the 30" reinforced concrete outlet. This outlet is equipped with both a manual valve system and an inflatable balloon system. The observed leakage ~~raises questions about the overall reliability of these closure mechanisms.~~ See recommendations in Section 1.2.5. ^{requires corrective action.} *

1.1.6 Conclusions Regarding the Adequacy of Maintenance and Methods of Operation

The current maintenance and methods of operation appear to be adequate for the bottom ash management unit. ~~There is a recommendation in Section 1.2.6 that will improve the overall maintenance of the unit.~~ There was no evidence of significant repairs or prior releases observed during the field inspection. *

1.1.7 Conclusions Regarding the Adequacy of the Surveillance and Monitoring Program

The surveillance program appears to be adequate. ^{documenting} There is a recommendation in Section 1.2.7 that may assist in ~~ensuring~~ regular reviews and identifying potential problems. The management unit dikes are not instrumented. Based on the size of the dikes, the portion of the impoundment currently used to store wet bottom ash, the history of satisfactory performance and current inspection program, installation of ^{additional} dike monitoring program ^{are} is not needed at this time. ✓

1.1.8 Classification Regarding Suitability for Continued Safe and Reliable Operation

^{only} ~~The facility classification is POOR for continued safe and reliable operation. The classification is due to the lack of critical technical documentation of engineering analyses verifying slope stability safety factors of the management unit dikes.~~ *

See Section 1.2.8 on Page 1-4 !!?

These don't match!!

^{supporting}

In all other regards, the facility appears to be safe and reliable and will be rated as satisfactory upon transmittal of the required analysis.

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1.2 RECOMMENDATIONS

1.2.1 Recommendations Regarding the Structural Stability

Although observations made during the site visit do not indicate signs of overstress, significant settlement, shear failure, or other signs of instability, the structural stability cannot be evaluated without reviewing the results of engineering analyses of the slope stability factors of safety under various load conditions. It is recommended that if the original design analyses cannot be located, a new geotechnical engineering evaluation be conducted. The new geotechnical engineering evaluation should be based on current standards, including seismic loading conditions.

1.2.2 Recommendations Regarding the Hydrologic/Hydraulic Safety

No recommendations appear warranted at this time.

1.2.3 Recommendations Regarding the Supporting Technical Documentation

Continued efforts to locate the original slope stability design documentation are recommended. If the original documentation cannot be located within a reasonable period of time, a geotechnical engineering evaluation is recommended to verify the embankment has an acceptable factor of safety for all anticipated loading conditions, including seismic loading.

1.2.4 Recommendations Regarding the Description of the Management Unit(s)

No recommendations appear warranted at this time.

1.2.5 Recommendations Regarding the Field Observations

Minor
The seepage through the outlet should be investigated and ~~the 30" pipe should either be removed~~ or an alternate closure mechanism installed on the outlet pipe. *corrected* } *

1.2.6 Recommendations Regarding the Maintenance and Methods of Operation

and ~~Although the maintenance program appears to be adequate, it is recommended that a vegetation control program be instituted.~~ A regular mowing ~~or spraying~~ program *is used* would improve periodic inspections as well as improve the ability to identify ~~animal borrows~~ or other potential problems. *and prevent* } *

It is recommended that future inspections be coordinated with maintenance program activities to allow inspections following mowing on the dike slopes.

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This is already
being done

- 1.2.7 Recommendations Regarding the Surveillance and Monitoring Program
- It is recommended that ^{the} a written Surveillance program ^{be continued.} of the dike system be developed. ~~Such a system will ensure regular inspections and possibly prevent deterioration of dike conditions.~~ * !

1.2.8 Recommendations Regarding Continued Safe and Reliable Operation

No recommendations appear warranted at this time. ✓

1.3 Participants and Acknowledgement

1.3.1 List of Participants

Patrick J. Cassidy--- Kansas City Board of Public Utilities
Pat Knefel---Kansas City Board of Public Utilities
Phillip Loun---Kansas City Board of Public Utilities
John Fuentez---Kansas City Board of Public Utilities
Ingrid Setzler---Kansas City Board of Public Utilities
Edward Byrd---Kansas Dept. of Agriculture (State Dam Review)
Stacey Baalman---Kansas Dept. of Health & Environment
Gilbert R. Jones, P.E.---Dewberry
Frank Lockridge, P.E.--- Dewberry

1.3.2 Acknowledgement and Signature

We acknowledge that the management unit referenced herein has been assessed on September 21, 2010.

Gilbert R. Jones, P.E. (KS#18547) ✓

Frank Lockridge, P.E. ✓

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2.0 DESCRIPTION OF THE COAL COMBUSTION WASTE MANAGEMENT UNIT(S)

2.1 LOCATION AND GENERAL DESCRIPTION

The Nearman Creek Power Station is in Wyandotte County, Kansas in the Parkville Bend of the Missouri River. Its location on the south bank of the river is highlighted on the USGS Parkville Quadrangle map included in Appendix A as Doc. 01.

The Coal Combustion Waste Management Units were designed by Lutz, Daily & Brain of Shawnee Mission, Kansas and were constructed in 1980. (Appendix A, Doc 02) The units consist of a bottom ash settling pond and a clear water pond. They form a closed loop with the clear water being recycled to the plant operations. The units are enclosed by earthen dikes constructed from on-site clay and clayey silt materials. The dikes have a nominal crest elevation of 763 and the pond has a low point of 741.5, resulting in a maximum height of the dike of 21.5 ft. The crest width varies from 16-24 ft. with the western dike merging into the plant flood protection dike and consequently a much wider section. The side slopes are 3H:1V on both faces. The impoundment is 6.6 acres and has a storage capacity of 200,000 cubic yards.

Table 2.1: Summary of Dike Dimensions and Size¹	
	Nearman Creek Power Station Ash Pond
Dike Height (ft)	21.5
Crest Width (ft)	16-24
Length (ft)	2500 (excluding western boundary)
Side Slopes (upstream) H:V	3:1
Side Slopes (downstream) H:V	3:1

¹ Based on design data on original construction drawings (Appendix A -Doc. 2)

The management unit is divided into two cells by an internal clay berm. The northern cell operates as a primary ash settling basin. The eastern cell operates as a clear water basin. The cells are hydraulically connected by a 24" RCP through the eastern section of the internal dike. Normal pool of water in the primary ash settling cell is approximately 758.8 ft.

This dike is not currently on the Kansas Department of Agriculture list of dams.

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2.2 SIZE AND HAZARD CLASSIFICATION

The classification for size, based on the height of the embankment and the impoundment storage capacity is "Small" using the USACE Recommended Guidelines for Safety Inspection of Dams ER 1110-2106 criteria summarized in Table 2.2.a.

**Table 2.2a: USACE ER 1110-2-106
Size Classification**

Category	Impoundment	
	Storage (Ac-ft)	Height (ft)
Small	50 and < 1,000	25 and < 40
Intermediate	1,000 and < 50,000	40 and < 100
Large	> 50,000	> 100

Dewberry conducted a qualitative hazard classification based on the Federal Guidelines for Dam Safety, dated April, 2004. The hazard assessment classifications are summarized in Table 2.2.b

**Table 2.2b: FEMA Federal Guidelines for Dam Safety
Hazard Classification**

	Loss of Human Life	Economic, Environmental, Lifeline Losses
Low	None Expected	Low and generally limited to owner
Significant	None Expected	Yes
High	Probable. One or more expected	Yes (but not necessary for classification)

There are no residences between the ash pond and the Missouri River. Therefore, loss of human life is not probable in the event of a catastrophic dike failure. Ash released as a result of a catastrophic dike failure is likely to be captured by the operator-owned flood plain between the dike and the river. Therefore, Dewberry evaluated the ash pond embankment hazard classification as "low."

2.3 AMOUNT AND TYPE OF RESIDUALS CURRENTLY CONTAINED IN THE UNIT(S) AND MAXIMUM CAPACITY

The ash settling basin receives bottom ash and boiler slag from the plant. In rare instances, fly ash has been discharged to the unit. No other wastewaters from the plant are discharged to the pond. The capacity and elevation of the basin is provided in Table 2.3 below.

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Table 2.3: Maximum Capacity of Unit	
Ash Pond Name: Nearman Creek Power Station	
Surface Area (acre) ¹	6.6
Current Storage Capacity (cubic yards) ¹	107,282
Current Storage Capacity (acre-feet)	66.5
Total Storage Capacity (cubic yards) ¹	200,000
Total Storage Capacity (acre-feet)	124
Crest Elevation (feet)	763
Normal Pond Level (feet)	758.8

¹ Based on design data on original construction drawings (Appendix A - Doc. 2)

2.4 PRINCIPAL PROJECT STRUCTURES

2.4.1 Earth Embankment

The approximately 2,500 foot long, ash pond dike is composed of controlled compacted clays and clayey silts. The crest width varies from 16-24 feet with a gravel surface to provide vehicle access. Both up-gradient and down-gradient slopes are 3H:1V. The slopes are protected with medium (8-16") rip rap.

2.4.2 Outlet Structures

The impoundment primary outlet consists of a 24" reinforced concrete pipe with an invert elevation of 745.5', which discharges to the clear water basin. The original construction also included a 30-inch diameter reinforced concrete discharge pipe located in the eastern section of the dike. Since the ponds are designed to operate as a completely closed system, the plant management decided to close this discharge pipe and used an inflatable balloon system to do so. ~~This system requires continual inspection and inflation of the balloon using a hydrogen tank located close to the outlet end of the pipe. A recommendation is included in Section 1.2.5 regarding a more permanent closure.~~ *

2.5 CRITICAL INFRASTRUCTURE WITHIN FIVE MILES DOWN GRADIENT

A critical infrastructure inventory survey was not provided to Dewberry for review. ***?

Based on available topographic maps, surface drainage in the vicinity of the ash pond is to the north-northeast toward the Missouri River. An eastward flowing bend in the Missouri River intercepts surface runoff approximately 1,500 feet north of the impoundment. Nearman Creek is between the impoundment and the river and ~~would receive any release~~ from the impoundment prior to discharge into the }

Nearman Creek Power
Kansas City Board of Public Utilities
Kansas City, Kansas

Coal Combustion Waste Impoundment
Dam Assessment Report

2-3

MAY

This section is for "descriptions" not "Comments"

Not requested!

We were told during the inspection this was not really necessary due to location !!

This is a small BA Pond !!

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Missouri River. Based on available aerial photographs and a brief driving tour of the area Dewberry did not identify any residences between the plant and the river. Interstate Highway 635 crosses the river approximately 2-3 miles to the east of the plant.

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3.0 SUMMARY OF RELEVANT REPORTS, PERMITS, AND INCIDENTS

The Kansas City Board of Public Utilities provided copies of original design drawings of the ash pond, bid specs for their construction, boring locations and other subsurface information, NPDES Permit and Solid Waste Landfill Permit information, and a geotechnical report from Terracon investigating erosion problems on the internal face of the dikes (See Appendix A – Doc 04).

The Terracon report recommended several types of slope protection to prevent erosion of the internal slopes. In response to this report, plant management placed rip rap on both the internal and external slopes.

3.1 SUMMARY OF LOCAL, STATE, AND FEDERAL ENVIRONMENTAL PERMITS.

wastewater
Discharges from the plant is regulated by the Kansas Department of Health & Environment and has been issued a National Pollutant Discharge Elimination System Permit, Permit No. I-MO25-B001. The NPDES permit was effective October 1, 2006, and expired December 31, 2008. This Permit renewal ~~request has been applied for~~ and is pending approval by the Kansas Dept. of Health and Environment. *Current*

Kansas
The Department of Health & Environment also issued Permit No. 413 for the on-site solid waste landfill that receives fly ash and bottom ash from the plant. *was applied for*

3.2 SUMMARY OF SPILL/RELEASE INCIDENTS

Data reviewed by Dewberry did not indicate any spills, unpermitted releases, or other performance problems with the embankment.

*Note: This work was done before the TVA collapse!

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4.0 SUMMARY OF HISTORY OF CONSTRUCTION AND OPERATION

4.1 SUMMARY OF CONSTRUCTION HISTORY

Now rip rap had been placed on the impoundment dike per the recommendations contained in the Terrecon June 2008 Geotechnical Report (see Doc. 4).

4.1.1 Original Construction

The Nearman Creek ^{bottom} ash pond was designed in mid-1979 by Lutz, Daily and Brain Consulting Engineers. The embankment was constructed by H.E. Bohrer Excavating in late 1979 and early 1980. The unit was constructed substantially as shown on the drawings for Contract 75A (See Appendix A – Doc. 02)

4.1.2 Significant Changes/Modifications in Design since Original Construction

The dike has not been significantly changed or modified since the original construction. ✓

4.1.3 Significant Repairs/Rehabilitation since Original Construction

~~No information was provided regarding major repairs or rehabilitation to the embankment or outlet structures. No evidence of prior releases, failures or patchwork was observed on the earthen dike during Dewberry's visual assessment that indicates prior release or failures have occurred.~~ ??

See page 5-2 +++
?

Terrecon Report!!

4.2 SUMMARY OF OPERATIONAL PROCEDURES

4.2.1 Original Operational Procedures

The impoundment was designed and operated for bottom ash sedimentation and control. Bottom ash is transported by slurry to the west end of the impoundment for primary sedimentation. An internal dike divides the impoundment into two cells; the north cell is the primary settling pond and a smaller southern cell is the clear water pond. Water flows from the north to south sections of the impoundment by gravity via a pipe through the cell divider dike. Water from the clear water cell is recycled back to the plant for reuse. Figure 4.2.1-1 shows the configuration of the pond cells.

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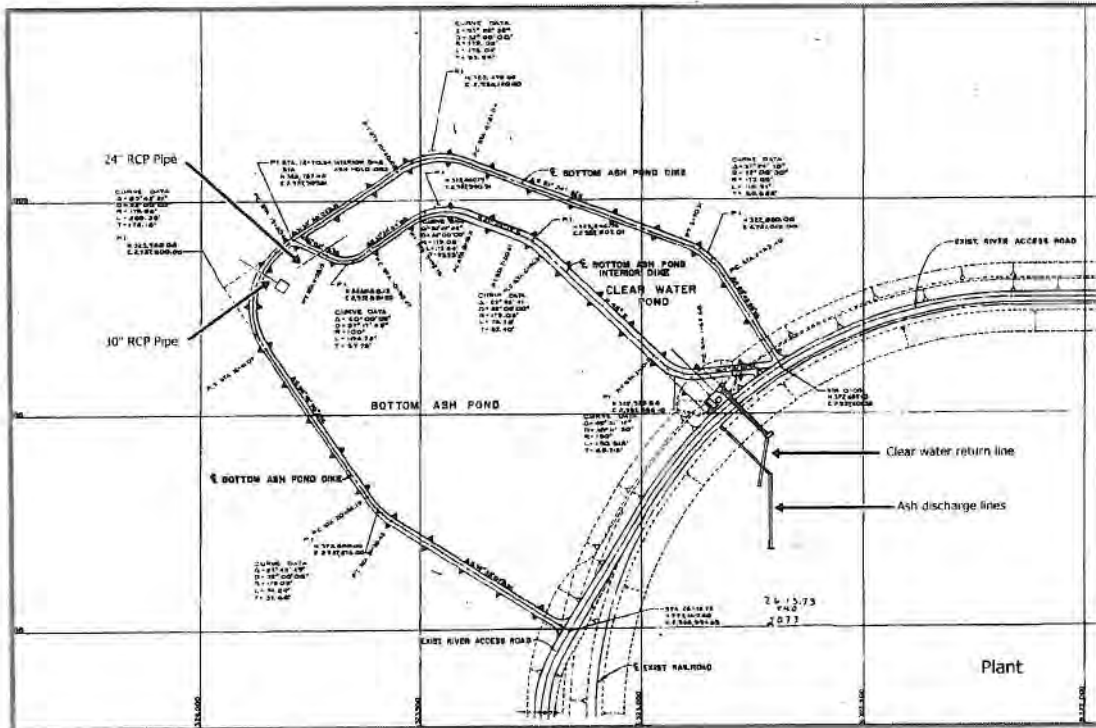


Figure 4.2.1-1: Configuration of the Ash Pond at the KCBPU Nearman Creek Facility

4.2.2 Significant Changes in Operational Procedures and Original Startup

The original design included a 30-inch mid-depth discharge pipe regulated with a mechanical gate. The purpose of this pipe was to permit inflow into the pond in case of flooding to help stabilize the embankments during construction and prior to operational start-up. This pipe has reportedly been closed since construction of the pond was completed. When the mechanical gate started leaking, plant management decided to close this pipe using an inflatable balloon system. However, a small amount of leakage was observed from this pipe during the site visit, raising questions regarding the reliability of these closure mechanisms.

4.2.3 Current Operational Procedures

Current operational procedures include daily observations of the dike system by plant operating staff and a monthly walkover and written report by the Senior Environmental Scientist. See Appendix A – Doc 03. This

BPU Environmental Services staff.

g **DRAFT** *g g*

~~form indicates only landfill inspection; however, the inspector said she also inspected the ash pond dike.~~

4.2.4 Other Notable Events since Original Startup

No additional information was provided to Dewberry of other notable events impacting the operation of the impoundment.

Note: the bottom ash pond is a permitted landfill by the State of Kansas

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5.0 FIELD OBSERVATIONS

5.1 PROJECT OVERVIEW AND SIGNIFICANT FINDINGS

Dewberry personnel Gilbert Jones, P.E., and Frank Lockridge, P.E., performed a site visit on Tuesday, September 21, 2010, in company with the participants.

The site visit began at 1:00 PM. The weather was warm and partly cloudy. Photographs were taken of conditions observed. Please refer to photographs in Appendix B and the Dam Inspection Checklist in Appendix C. Selected photographs are included here for ease of visual reference. All pictures were taken by Dewberry personnel during the site visit.

Based on the observations during the site visit no significant findings were noted and the embankment appears to be performing in accordance with design expectations.

5.2 EARTH EMBANKMENT

5.2.1 Crest

The crest of the embankment had no signs of significant depressions, tension cracks or other indications of settlement or shear failure. Figure 5.2.1-1 shows the typical crest conditions.



Figure 5.2.1-1: Photograph of Impoundment Dike Crest View

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5.2.2 Inside Slope

The inside slope of the embankment has been covered with medium (8-16") rip rap per the recommendation of Terracon Engineers. There were no observed scarps, sloughs, bulging, cracks, depressions or other indications of slope instability. Figure 5.2.2-1 shows a representative section of the interior slope of the embankment.



Figure 5.2.2-1: Photo of Embankment Inside Slope View – East end of ash pond looking northwest.

5.2.3 Outside Slope and Toe

The outside slope of the embankment is also covered with rip rap. A significant amount of vegetation is present in several areas, particularly along the northern slope. No major scarps, sloughs, bulging, cracks, depressions or other indications of slope instability, or signs of uncontrolled seepage were observed. Figure 5.2.3-1 shows a representative section of the outside slope of the embankment.

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Figure 5.2.3-1: Photo of Embankment Outside Slope View – North side of ash pond dike looking up the exterior of the dike.

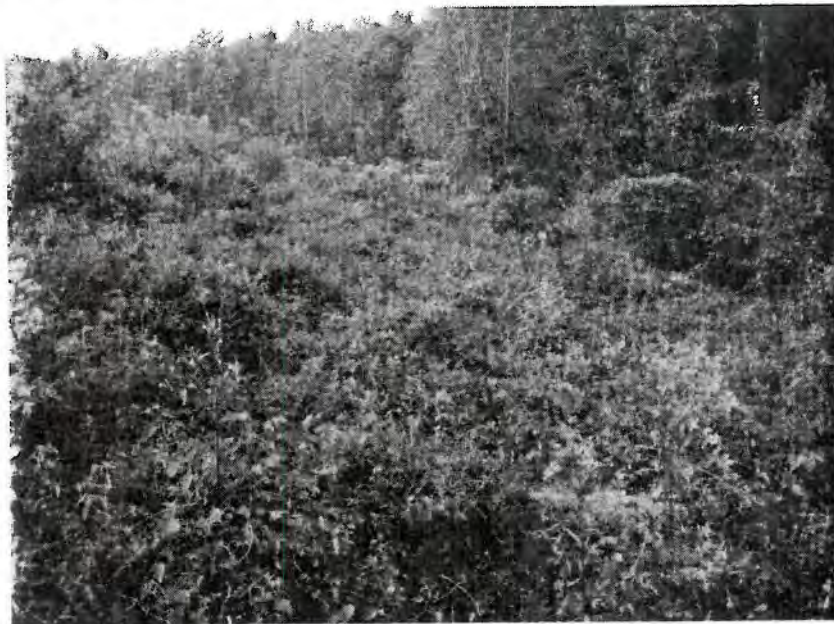


Figure 5.2.3-2: Photo of Embankment Outside Slope View – East side of ash pond dike looking north.

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Heavy vegetation along the northern slope made access and visual observation difficult, but there were no obvious areas of seepage or soft soils along the toe of the down-gradient slope.



Figure 5.2.3-3: Photo of Outside Embankment Toe – North side of ash pond dike looking west.

5.2.4 Abutments and Groin Areas

Neither erosion nor uncontrolled seepage was observed along the groins or abutments. Groin slopes and abutments are protected with the same rip rap cover as the adjoining slopes. Figures 5.2.4-1 and 5.2.4-2 show typical conditions observed at the groins and abutments.

Rip rap had been recently added and appeared in good condition.

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Figure 5.2.4-1: Photo of Interior Groin at Northwest Corner of Impoundment. Note that the dike in upper right hand corner also serves as the flood prevention dike for the plant.



Figure 5.2.4-2: Photo of Exterior Groin at Northwest Corner of Impoundment. Note that the dike in upper left hand corner also serves as the flood prevention dike for the plant.

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5.3 OUTLET STRUCTURES

5.3.1 Flood Inflow/Outlet Structure

An outflow structure is located in the northeast corner of the impoundment. The structure consists of a 30-inch diameter reinforced concrete pipe regulated with a mechanical gate (see Figure 5.3.1-1) and inflatable balloon, both of which are reported as closed at all times.

However, as shown in Figure 5.3.1-2, a small amount of ~~discharge was observed leaking from~~ the outlet at the time of the site visit. The pipe's invert elevation is 751.5ft. The purpose and current condition of this structure is discussed further in Section 4.2.2.

water was
pooled at



Figure 5.3.1-1: Photo of Mechanical Gate on Discharge Pipe in Interior of Ash Pond

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Figure 5.3.2-2: Photo of Drainage at Exterior End of 30" Discharge Pipe

5.3.2 Inlet Conduit

Two 10" ductile iron pipes discharge bottom ash into the south section of the bottom ash settling pond, see Figure 5.3.2-1.

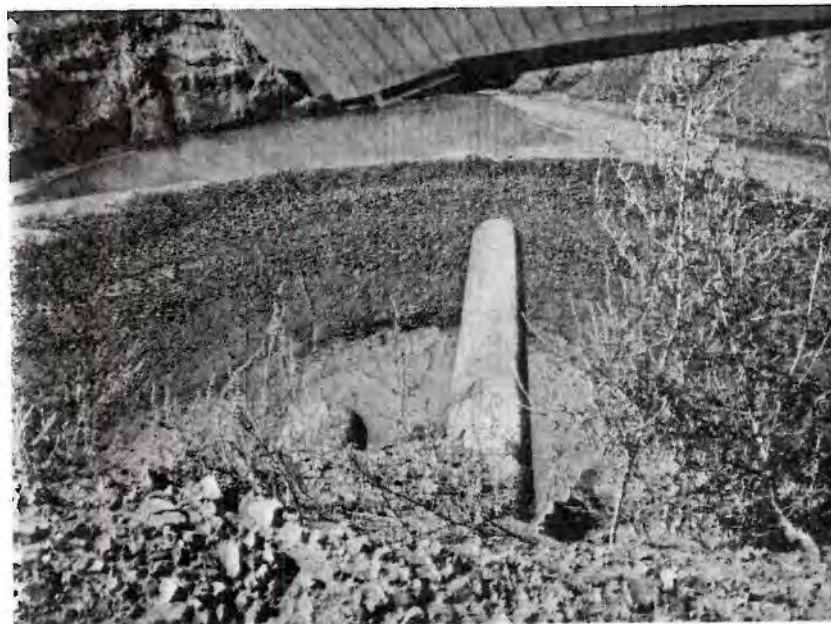


Figure 5.3.2-1: Photo of Bottom Ash Discharging into Ash Pond.

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5.3.3 Low Level Outlet

The Nearman Creek Bottom Ash Impoundment does not have a low level outlet.



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6.0 HYDROLOGIC/HYDRAULIC SAFETY

6.1 SUPPORTING TECHNICAL DOCUMENTATION

6.1.1 Flood of Record?

? ? No documentation has been provided about the flood of record. ✓

6.1.2 Inflow Design Flood

This impoundment does not accept water from any exterior areas. ✓

6.1.3 Spillway Rating

This impoundment does not have a spillway.

6.1.4 Downstream Flood Analysis

No downstream flood analysis data were provided to Dewberry for review.

? ?
Was this
requested?
? ? ?

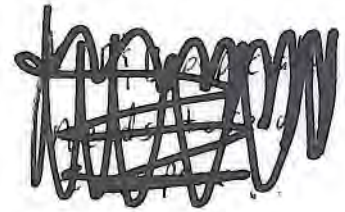
6.2 ADEQUACY OF SUPPORTING TECHNICAL DOCUMENTATION

Supporting documentation reviewed by Dewberry is adequate to assess the hydrologic/hydraulic safety of the fly ash impoundment. ✓

6.3 ASSESSMENT OF HYDROLOGIC/HYDRAULIC SAFETY

This impoundment does not accept water from any exterior areas. Hence the dike failure by overtopping seems improbable.

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7.0 STRUCTURAL STABILITY

7.1 SUPPORTING TECHNICAL DOCUMENTATION

7.1.1 Stability Analyses and Load Cases Analyzed

No stability analyses were provided to Dewberry for review. Dewberry engineers did not observe any significant structural defects on the dike during their site walkover. However, because of the lack of documentation of engineering analyses verifying design slope stability, the structural soundness of the management unit is rated **POOR**.

7.1.2 Design Parameters and Dam Materials

Construction specifications provided for review (Appendix A –Doc 5) indicate the embankment design is a compacted clay and /or clayey silt fill with a compacted clay core. Construction drawings indicate material for the embankment came from the plant area, and from within the impoundment as needed. The construction drawings are signed and sealed by a registered engineer licensed in the State of Kansas.

7.1.3 Uplift and/or Phreatic Surface Assumptions

No documentation of uplift calculations or phreatic surface assumptions was provided to Dewberry for review.

7.1.4 Factors of Safety and Base Stresses

No documentation of embankment slope stability factors of safety or base stresses was provided to Dewberry for review.

7.1.5 Liquefaction Potential

No documentation of soil liquefaction analyses was provided to Dewberry for review.

7.1.6 Critical Geological Conditions

Documentation provided to Dewberry for review (See Appendix A – Doc 10) indicates the Nearman Creek Power Station ash pond is located within the alluvial and terrace deposits of the Missouri River. The soil types and bedrock contact contours in the Missouri River Valley are generally the result of flow and meander of the river during and after

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periods of glaciation. The ash pond embankment is located on a post-glaciation terrace of the upper terrace into which the embankment abuts.

Soils strata in the area generally consist of:

- Approximately 15-20 feet of soft to firm silty clay
- Approximately 20 feet of dense fine and clayey fine sand
- Extending to bedrock is a layer of approximately 80 to 90 feet of dense fine to coarse sand.

7.2 ADEQUACY OF SUPPORTING TECHNICAL DOCUMENTATION

The technical documentation provided to Dewberry lacks ~~critical~~ ^{supporting} engineering analyses required to assess the structural stability of the ash pond embankment. If the original slope stability design calculations cannot be located, new geotechnical engineering analyses should be conducted to verify the existing slope stability safety factors meet or exceed acceptable criteria.

7.3 ASSESSMENT OF STRUCTURAL STABILITY

Based on the lack of ^{readily available} technical documentation, the structural stability of the pond embankment is ^{must be} rated as POOR. ^{per EPA guidelines.} ??

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8.0 ADEQUACY OF MAINTENANCE AND METHODS OF OPERATION

8.1 OPERATING PROCEDURES

The facility is operated for the settlement and storage of wet bottom ash. Coal combustion waste process water discharges into the west side of the north cell, which is separated from the south section by an earthen dike. The north side of the impoundment is the primary sedimentation area. Decant water flows by gravity to the southeast section of the impoundment through a pipe in the dividing dike. Figure 8.1-1 shows the dividing dike.



Figure 8.1-1: Photo of dike dividing ash pond from clear water pond.

8.2 MAINTENANCE OF THE DAM AND PROJECT FACILITIES

The plant Emergency Response Action Plan is attached in Appendix A – Doc 10.

Plant management has instituted several standard practices to validate the condition of the plant dike, impoundment structure, and the solid waste storage areas.

- A senior member of the environmental staff performs monthly checks of the dike and waste areas.

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- Plant personnel are required to be aware of the condition of the impoundment dikes as they work on and around them.
- FEMA requires periodic inspection of the plant dike system, which includes a portion of the ash pond dike.

8.3 ASSESSMENT OF MAINTENANCE AND METHODS OF OPERATIONS

8.3.1 Adequacy of Operating Procedures

Based on the assessments of this report, operating procedures appear to be adequate. ✓

8.3.2 Adequacy of Maintenance

Although the maintenance program appears to be adequate, the following recommendation is made to improve the maintenance and help ensure a trouble free operation:

- Increase frequency of mowing dike embankments or institute vegetation control program to improve the effectiveness of daily observations and monthly inspections. ✓

? → *

↑
To Asplundh??

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9.0 ADEQUACY OF SURVEILLANCE AND MONITORING PROGRAM

9.1 SURVEILLANCE PROCEDURES

The plant does not have a written program for periodic review of the dike system. It is recommended that a written program be established to assist in early identification of potential problems.

9.2 INSTRUMENTATION MONITORING

The Nearman Creek Power Station flyash pond embankment does not have an instrumentation monitoring system

Where did 'fly' come from?

? bottom ?

or need

9.3 ASSESSMENT OF SURVEILLANCE AND MONITORING PROGRAM

9.3.1 Adequacy of Inspection Program

Based on the data reviewed by Dewberry, including observations during the site visit, the inspection program is adequate.

9.3.2 Adequacy of Instrumentation Monitoring Program

Based on the size of the embankment, the current inspection program, and the observations made during this site visit, an embankment monitoring program is not needed at this time.

Solid waste landfill inspections are documented on a written "checklist" form.